

**WHAT TAX IS BEST? THE ECONOMICS  
OF NATURAL RESOURCE TAXATION  
IN LITHUANIA**

**Randall Bluffstone**

Environment Discussion Paper No. 14  
January 1997

*C4EP PROJECT*

*Central and Eastern Europe Environmental Economics and Policy Project*

This paper was sponsored by the Harvard Institute for International Development (HIID) under a cooperative agreement with the U.S. Agency for International Development (USAID).

Randy Bluffstone is HIID's Senior Environmental Policy Advisor in Lithuania.

**Acknowledgments:** Research assistance by Annette Huber and helpful information on the environmental effects of mining operations provided by Mr. A. Janukonis, Chief of the Mineral Resources Division of the Ministry of Environmental Protection, are gratefully acknowledged.

The views expressed are solely those of the author(s) and do not necessarily represent the views of the U.S. Agency for International Development, the host government, or the Harvard Institute for International Development. The boundaries, colors, and other information shown on any map in this volume do not imply any judgment on the legal status of any territory or the endorsement or acceptance of such boundaries.

This paper is for discussion purposes and HIID welcomes comments, which will be relayed to the authors. This document should not be quoted without the permission of HIID or the author(s).

For additional information please contact: International Environment Program, Harvard Institute for International Development, One Eliot Street, Cambridge, MA 02138.  
Tel: (617) 495-5176. Fax: (617) 496-8040.

## I. INTRODUCTION

Starting as early as 1994, the Ministry of Environmental Protection (MEP) of the Republic of Lithuania<sup>1</sup> began receiving requests from enterprises and others to revise the system for calculating taxes on state-owned natural resources in Lithuania. In 1995 the MEP began work on this issue with the goal of preparing new legislation governing this taxation system.

In Lithuania all mineral and water resources are state owned. Enterprises and individuals receive permission to extract these resources by receiving a permit from MEP regional departments. The right to use this state property is then taxed under the Law on Taxes on State-Owned Natural Resources adopted by the Supreme Council of the Republic of Lithuania in March, 1991 (MEP, 1992).<sup>2</sup> A government decree was passed two months later which more clearly defined the resources subject to taxation and set tax rates on each resource. These resources included oil, natural gas, soft minerals (sand, gravel, clay), peat, mineral water, groundwater and surface water. In November, 1992 another government decree established the methodology for calculating tax burdens. This methodology defined taxes to be paid per unit of resources extracted and was based on a previous method developed during the Soviet period. In 1994 taxation of natural resources generated Lt. 19 million (\$US 4.75 million) for the state budget.

The main complaint with the system was that the methodology for calculating natural resource taxes was overly-complex and burdensome on both enterprises and government agencies. Indeed, in some cases one week per year was spent by enterprise economists to make the calculations necessary to fulfill the requirements of the law. With such complexity, there was often no practical way for the Geological Service of the Republic of Lithuania, which was charged with monitoring compliance, to be sure natural resource extractors complied with the law.

An even more important problem, however, was that the methodology developed for taxing mineral resources resulted in tax calculations which bore little relation to the economic circumstances of natural resource-extracting enterprises. This is perhaps not surprising, because the main purpose of the so-called "methodics" was to make tax burdens fair across enterprises having access to different quality resources.

---

<sup>1</sup>

In June, 1994, the Department of Environmental Protection was elevated to cabinet level and became the MEP.

<sup>2</sup> In an attempt to not further confuse the jargon surrounding natural resource taxation, I would like to note that because enterprises are paying for the right to use public property, the terms "charge" or "fee" would be more appropriate than the word "taxation," which is the official terminology in Lithuania.

Revising the tax methodology to reduce administrative costs is of particular interest because foreign exchange earnings attributable to the export of natural resources account for several million dollars per year. Horticultural peat exports alone generate approximately \$3.3 million on an annual basis. To successfully compete in international markets, and to enjoy the increased foreign exchange earnings which come with participation, are therefore important economic goals.

In 1995, the MEP was charged by the Government of Lithuania with making recommendations for a revised system for taxing state-owned natural resources, but in reality there were few environmental issues weighing on the process. Damage to the environment was not a major factor motivating taxation, and it is not intuitively obvious why this instrument even comes under the domain of the MEP. Indeed, degradation of land from mining enterprises is considered to be minor, as it typically occurs in remote areas or on land of low agricultural productivity and because a relatively small 35,000 hectares nationwide are mined (Janukonis, 1995). Mining enterprises are also not major water or air polluters. As will be discussed in more detail below, the main issue is the relatively standard one in natural resource economics -- choosing instruments for rent capture.

Taxes on state-owned natural resources are not the only tax faced by extractors of mineral resources. In total they are subject to three major taxes and one charge. These are:

- I. Land Rent - a tax per hectare payable to municipalities which is based on the estimated market value of the land
- II. Profit Tax - normal income tax paid by all firms
- III. Natural Resource Tax - paid to the state budget depending on extraction levels
- IV. Land Reclamation Charge - enterprises must restore mined land to a standard of quality negotiated between the enterprise and the MEP; they must save sufficient funds for reclamation.

Land rent and the natural resource tax are deductions which may be used to reduce an enterprise's profit tax liability. The land reclamation charge is not deductible.

This paper focuses on options and choice of instruments for rent capture, and on the distribution of resource rents. The next section covers theoretical issues. Section III reviews candidate instruments, and Section IV presents preliminary conclusions and recommendations.

## **II. IMPORTANT THEORETICAL ISSUES AND SOME OBSERVATIONS ON THE CURRENT SYSTEM OF NATURAL RESOURCE TAXES**

### ***Sustainability and The Potential Role of Natural Resources in the Process of Economic Growth***

Natural resources which are economically scarce<sup>3</sup> generate "economic rents," which are the gross profits earned from the extraction and sale of natural resources. Because the rent earned from a natural resource is closely related to its scarcity, it is expected that as resources are used up over time, the rent should increase. Extractors of natural resources therefore reap the financial benefits from increasing scarcity.

If natural resources are viewed as *national wealth* and therefore not the property of any individual, these resources should serve broader economic objectives. One important example of such an objective is economic growth which, of course, requires investment. How can natural resources serve this particular goal? If mechanisms and incentives are available for rents to be invested and channeled into productive activities, they represent a source of value which can fuel growth and therefore future prosperity. To the extent that a process of extraction, followed by a sufficient level of investment occurs, many economists would indeed say that sustainable development is taking place.<sup>4</sup>

---

<sup>3</sup>

Meaning that all potential users of the resource cannot have all they would like of that resource for free, and they are therefore considered "valuable." Loosely speaking, the degree of scarcity determines how valuable a resource is.

<sup>4</sup> Variations on this view are presented, for example, in Pezzy (1991), Solow (1991), Vincent (1995), Vincent *et al* (1995).

There are several examples which could be cited which illustrate the point that it is the use of scarce, non-renewable natural resource wealth which is most important. For example, in Thailand there is at least some evidence to suggest that rents from extractions of timber resources have provided financial resources which have then been used for investment in non-resource sectors. The same appears to be true in Malaysia, though it is unclear exactly where that investment is taking place (Vincent, 1995).

In the case of petroleum, Norway makes careful efforts to ensure that a sufficient share of the value removed from Norwegian oil fields is invested rather than wasted. This is contrasted with the case of the United Kingdom, where it is believed that the country's oil wealth has been largely used to increase current consumption of goods and services (Solow, 1991). All else equal, future generations will therefore be less wealthy than those currently alive in the United Kingdom.

### ***Using the System of Natural Resource Taxes in Lithuania to Redistribute Natural Resource Rents***

Though from a national perspective perhaps the most important issue involves the proportion of resource rents invested versus the proportion spent on current consumption, the current distribution of benefits from resources is also important. It is a legitimate goal to take some of the rents from natural resources and distribute them more widely than simply to the enterprises which extract those resources. Whether this makes sense or not depends on the degree to which taking rents from *producers* creates incentives for them to *reduce production*.

As noted above, degradation of land due to the extraction of mineral resources, and concern over the scarcity of ground and surface water do not seem to be major issues and are not the main reasons for natural resource taxes. This is a very important point, because it appears that a goal of the natural resource tax structure ***should not be*** to try to encourage users of natural resources to be more environmentally-friendly (i.e. to correct the existing market to include environmental aspects, such as pollution). It should also be noted that any degradation of land which does occur is already taxed - through reclamation requirements - and if pollution occurs (e.g. during oil and gas extraction) it is already handled by the system of pollution standards and charges implemented by the MEP. Thus, the primary purpose of the natural resource tax is to *re-distribute* a portion of natural resource wealth from enterprises to the general population.

To accomplish this re-distribution of resource rents, the State as the owner of natural resources must construct mechanisms to balance two competing objectives:

---

1. To provide sufficient incentives for enterprises to continue extracting resources; unextracted resources are really savings and do not provide citizens with direct enjoyment. If left in the ground, resources may not even be the best form of savings.<sup>5</sup>

Many mineral resources have experienced declining prices over time (e.g. many metals, oil, coal), meaning that they are becoming less valuable. In such cases it is therefore best to extract the resource as quickly as possible, transform it into cash, and invest in an activity which at least yields a positive rate of return.

2. To collect a portion of the rents generated by natural resources and distribute that part to the general population of Lithuania, who are the real owners of the resources.

It should be clearly stated that if the goal is re-distribution of resource rents, there is no clear theoretical guidance to select one tax rate over another.<sup>6</sup> The tax calculation is, in

---

6

The only exception is when there are no rents to distribute. The World Bank (1993) in fact used this notion when it argued that water is so plentiful in Lithuania that it does not generate rents; they therefore argued for the abolition of natural resource taxes on ground and surface water.



fact, largely political, and is bounded on the top by enterprises' willingness to pay the tax and still produce, and on the bottom by the minimum tax acceptable to the State.<sup>7</sup>

### ***The Importance of Considering the Likely Response of Extraction Enterprises before Setting Taxes***

This does not imply that no guidance can be given, however it does mean that the question of what is the “right” tax is empirical rather than theoretical one. The tradeoffs presented above also suggest that it is very important for the State to estimate the *change in output which will occur if taxes are increased*.<sup>8</sup> To illustrate the importance of this point, suppose that natural resource extracting enterprises reduce output by 10% for each 5% increase in taxes. In this case the percentage change in quantity is greater than the increase in tax rate. If this is the case, total tax revenues will actually *fall* as tax rates rise.

It should also be noted that there is likely to be a substantial difference between estimates of enterprises' responsiveness in the *long-run* and in the *short-run*. At any point in time, mining enterprises may have little choice but to keep producing because of contractual obligations and because mining equipment may not be usable for other purposes. Over time, however, contracts expire and equipment wears out. With very high taxes, some firms may choose to leave the mining business altogether. Other firms may simply reduce the size of their operations.

Estimates of the responsiveness of mining enterprises in metals and energy have been made for other countries. While there is no guarantee that responses will be similar in Lithuania where mined materials are quite different, the estimates provide some guidance on what the expected response over time might be. The results indicate that enterprises will indeed reduce output in the long-run if taxes increase (this is perhaps not surprising); but in percentage terms the reduction in output will be *less* than the increase in taxes. The possibility presented above - that relatively small increases in tax rates could lead to a reduction in total tax revenues - has not been observed.

### **Percentage Change in Output *In the Long Run* When Tax Rates Increase by 1.0%**

Mined Commodity	Percentage Change in Long-Run Output
Non-Ferrous Metals (e.g. Aluminum, Copper, Bauxite, Tin, Zinc)	.5%

---

<sup>7</sup> For example, in the case of mining, the State may have the capability to mine the resource itself and this lower bound would be related to the profit that state-run mining enterprises would earn.

<sup>8</sup> This is called the Elasticity of Supply.

Ferrous Metals (e.g. Iron and Nickel)	.5%
Aggregate Energy	.5%

Source: Slade (1992) Synthesized from Several Econometric Studies Conducted Worldwide

With the re-distributive goal in mind, it is also important to know something about the demand side of the market. For example, what percentage of any increase in taxes can be expected to be passed on to consumers of natural resources? What will be the effect on industries which use natural resources as inputs, and what is the economic status of those firms and their employees? In fact, if people owning and working in natural resource extraction and downstream industries, such as construction, have incomes below the national average, then the natural resource tax may actually make the income distribution worse.

### ***Financial Mechanisms for Redistributing Rents to Future Generations***

As noted above, the major goal of the natural resource tax system in Lithuania appears to be to capture natural resource rents for re-distribution to the people. This transfer occurs using the State budget as a vehicle; prompting the following question regarding inter-generational distribution:

*Does this method serve the more general economic goal of economic growth and the related goal of assuring that future Lithuanians also benefit from extraction of non-renewable resources today?*

It appears that very little is explicitly being done. Some investment for the future by the government certainly does occur in non-resource sectors such as education and infrastructure development. While it is recognized that it would be a mistake to view all State budgetary expenditures as pure consumption,<sup>9</sup> the issue seems unclear enough to

---

<sup>9</sup> For example, construction of wastewater treatment plants (5% of the budget in 1994) and expenditures on education are best considered investments which will yield future benefits.

warrant investigation of interest in using the natural resource tax system explicitly to protect the interests of future generations.

The use of the budget as an instrument for re-distribution should be examined in light of the existence of alternative methods for distributing resource rents to future generations. For example, in 1976 the oil-rich US state of Alaska established a special fund into which 25% of oil royalties<sup>10</sup> collected from private oil companies are deposited. As of 1983, the Alaska Permanent Fund contained \$US 4 billion. These funds are then invested in financial markets; the principal and interest will be used in the future either to reduce taxes or fund social services. A similar fund was established in the same year in the Canadian Province of Alberta, funded by 30% of all oil royalties collected. These regional governments therefore set aside only *part* of the royalties for future generations and treat the rest as normal tax revenues which can be used to fund current expenditures (Hartwick and Olewiler, 1986).

An important point to be considered in deciding whether to set up an investment fund of this type in Lithuania is the expected level of administrative costs. Because natural resources tax revenues in Lithuania are only a few million dollars per year, it may simply not be worth setting up a separate structure of the type developed in Alaska and Alberta for managing the tax revenues of much larger industries. On the other hand, it may be found that a smaller, simpler, and less-expensive structure is available to serve the needs of Lithuania.

### ***Important Differences between Mineral and Water Natural Resources***

Should mineral and water resources be treated differently? As the World Bank (1993) points out, in Lithuania water *per se* does not appear to be scarce. If it is not, there are no rents generated and therefore no value created to be re-distributed from the extractor to the broader population. The Bank argues that this tax is not justifiable on economic grounds and should be abolished.

Mineral resources are truly non-renewable resources, but within very broad limits water is considered to be renewable because of the natural hydrological cycle. There may therefore be little reason to think that groundwater or surface water extractions today make water any more scarce for future generations. If there is reason to believe that current consumption of water in reality *does* deprive future generations of abundant water, then even if there are no rents generated today, there may be an argument for using

---

<sup>10</sup> A royalty is a fixed payment per unit (e.g. barrel of oil) of the resource extracted or a percentage of revenues earned by the natural resource extractor.

the natural resource tax to compensate future generations for the loss of value and to encourage conservation today.

Taxes (or more accurately, charges) may be an appropriate instrument because empirical estimates suggest that even small water charges create large incentives for conservation. For example, Rogers (1986) shows that while US electricity generation plants typically receive their cooling water free, except for the cost of pumping it from an ocean or river, a charge as small as \$US .014 per 1000 liters would create incentives for investment which would reduce water consumption from approximately 180 liters per kilowatt hour to about 2.9 liters per kilowatt hour - a 62-fold reduction in use of water from such a small charge. Evidence from other countries also suggests that charging on a *per unit* basis for water use, even if the charge is very low, can have a major effect on consumption.

Few examples of explicit water resource taxes are found in the world,<sup>11</sup> but it is clear that industrial and energy firms can be expected to respond quite strongly to even modest charges. This fact reflects the feature that very simple technological steps are available to save water. An example presented in Gibbons (1986) copied below shows that nearly all the decline in water demand by one of the Bethlehem Steel mills was expected to occur because of the initial low charges, rather than very high charges. Simply stated, the first water saving steps are very easy, but after a while technical possibilities are exhausted and even if charges become very high, enterprises can do very little to reduce water usage.<sup>12</sup>

*The main question for Lithuania and the MEP, however, is whether it makes sense, given the current level of demand on water resources to encourage conservation of that type along with the increased investment costs that conservation would imply.<sup>13</sup>*

---

<sup>11</sup> Typically, pricing water properly means that it is priced to account for the services of water provision or treatment (which are certainly scarce) rather than for water resources themselves.

<sup>12</sup> An important point is that this research was conducted almost 30 years ago. Technical possibilities are likely to have changed during this period and this will have the result of making the upper portion of the curve flatter.

<sup>13</sup> It should be noted that incentives for reduction of water pollution created by the system of pollution charges and standards will in many cases encourage recycling, which also conserves water.

*Figure on Water Savings*

***Functional Difference between the Natural Resource Tax and the Land Rent Tax Payable by Enterprises***

A final question to be raised about the current system of mineral resource taxes is to what degree the land rent paid by extraction enterprises fulfills the goal of the Republic to redistribute rents from enterprises to the population. As noted above, land rent payable to municipalities is calibrated on the value of the land. It is likely that in the case of mining that this value will be very closely related to the quality and quantity of natural resources. At least in principle, it does not appear that these taxes fulfill separate functions, and indeed according to MEP officials the only real difference in these two taxes is the recipient; municipalities receive land rents and the State budget receives natural resource taxes. Though it is not unusual for different levels of government to tax the same economic resource for revenue-raising purposes, at the very least this observation argues for an increased focus by the State on the inter-generational aspects of the redistribution problem.

### **III. CANDIDATE INSTRUMENTS FOR CAPTURING NATURAL RESOURCE RENTS AND EXPERIENCE FROM OTHER COUNTRIES**

#### ***A Menu of Instruments***

As Nellor and Sunley (1994) have pointed out, there is no magic formula for the choice of instruments for capturing rents by the State, and there is unlikely ever to be an identity of interests between mining enterprises and the State. Given the importance of capital investments to most mining enterprises, and the economic goal to provide incentives for firms to extract *all useful natural resources from a mine* (not just resources which are most easily extracted), perhaps a general principle is that care should be taken to define a stable relationship between the State and enterprises such that both sides know the rules of the game and understand that these rules will not change for ten to thirty years.

Several instruments are available to a government wishing to capture natural resource rents. These are merely listed and defined below, but will be discussed in somewhat greater detail in the context of the international experience.

**I. Lease Bonuses** - These are payments made in advance by enterprises for the right to extract natural resources from State lands over a given period of time. These payments may be determined by negotiation or by auction. As long as competitive conditions for such auctions are possible, auctions offer the advantage of providing the State with information regarding enterprises' willingness-to-pay for extraction rights. This is information which the State could not know in advance. To the extent that certain enterprises have customary rights to extract mineral resources from a given area, this instrument may not be appropriate.

**I. Royalty Payments** - These are taxes of the type currently levied in Lithuania. They can be calibrated either on the *value or the volume of natural resources extracted*. This method of rent capture has the advantage of being easy to calculate and easy to monitor with available information. It has the disadvantage of raising the cost of production whether the firm is profitable or not, and therefore may drive enterprises out of the market (Nellor and Sunley, 1994).

**I. Resource Rent Tax** - Under this method, a mining enterprise is allowed to earn a rental rate which is considered to be a "normal" return on its capital investments, but the rest of the rent is then captured by the State using a tax. This method essentially treats the enterprise as a price-regulated industry. The main advantage of this instrument is that investment decisions are not greatly influenced by the existence of the tax, because enterprises are allowed to earn a normal return on their investments.

In practice, however, this technique is very information-intensive and may not be practical in a setting where full information about market conditions is not available. The system also does not assure that the State gets enough to cover its redistributive obligations, because it only earns a return *after* the mining enterprise earns its "normal return".

### ***Considerations in the Choice of Instruments***

Though cases could probably be made for the other instruments, a system of rent capture relying heavily on royalties, such as is already found in Lithuania, is perhaps the most appropriate. It economizes greatly on calculation and monitoring costs, is relatively easy to implement, and has the added advantage of a history of use. As will be discussed in the next section, royalties are also the most common mineral resource tax in other countries.

Should the royalty be calculated as a percentage of the revenue earned by enterprises (like a sales tax) or as a flat rate per quantity of resources extracted? There are some technical details about how each type of tax operates, but the main practical difference is the treatment of price risk. If taxes are calculated as a percentage of the revenue derived from extractions, then price risk is effectively shared by the government and enterprises. For example, if the price of a resource falls by 50%, government tax revenues will also decline significantly. Enterprises are somewhat insulated from excessive taxation when

times are bad. Of course, when prices rise they must share the benefits with the government.

A tax based purely on quantity shifts all price risk to enterprises because the State receives its tax no matter how high or low the price. If natural resource taxes were to be increased in Lithuania and continue to be based on quantities extracted as they are now, then the taxes must be set at levels that will enable enterprises to bear that risk. Otherwise the State will be imposing a threatening extra cost on enterprises. In practice, this will mean that the MEP must investigate the profitability of enterprises and know at least something about the recent history of output and input prices. The MEP will then be able to estimate the result if prices fluctuated by what might be considered a reasonable amount (e.g. ten to forty percent). Tax rates are set such that firms are able to absorb input and/or output price risk.

With a tax based on enterprise revenues, the information needs with regard to firm profitability under various conditions are not so extensive, because tax collections rise and fall with prices. There are other information requirements, however. For example, to assure industry stability and that both enterprises and the MEP know how prices are calculated, it is important that the price portion of total revenue be based on a price which is easily visible to both parties (Nellor and Sunley, 1994).

For exported resources, such as peat and dolomite, this transparent price could be the export f.o.b. price. For resources traded only on a domestic basis, another price must be used. A price as close as possible to that actually received at the mine head is preferable; however, if necessary, the tax could be based on a price which is extremely transparent to both the State and the extracting enterprises, but which is somewhat downstream from the mine. For example, the price portion of this royalty might be calculated as a percentage of a final construction material, the price of which is known to be closely linked to the value of the natural resource used as a raw material. An appropriate allowance is then be made by the MEP for the value-added provided by the downstream manufacturer (Nellor and Sunley, 1994).

Because some of the most important resources taxed in Lithuania are traded internationally, it is very important not to put these industries at a competitive disadvantage. Taxes drive up the costs of production and can make international competition more difficult depending on the tax regimes found in other countries. To avoid such problems, a survey of the countries who are the most important competitors in each industry should be conducted to evaluate how those countries tax their natural resources. Taxes should then be set to *harmonize with these major competitors*.

### ***International Experience with Taxation of Mineral Resources***



The international experience with the taxation of mineral resources is quite varied and illustrates that no set rules of right and wrong practice apply. Most national and regional governments, in fact, appear to employ a combination of taxation instruments. A typical taxation package includes royalty payments combined with an income tax, or some sort of property tax or fixed annual fee (Nellor, 1987).

The sections below present the minerals tax experience of Latvia, the United States and selected other countries in which mining is important. For ease of presentation, most of the information is given in tables in the Appendices. Appendix I presents the experience of the US states, compiled by Conrad and Hool (1979). Appendix II contains the tax rates (based on quantities extracted rather than value) approved by the parliament or *Saeima* in Latvia in 1995 (Ministry of Environmental Protection and Regional Development of the Republic of Latvia, 1995). Appendix III is from Nellor (1987), and covers a variety of developing countries.<sup>14</sup> Though the experience with mineral tax structures and rates is certainly varied, certain conclusions can immediately be made:

---

14

Because of their importance in developing countries, Nellor (1987) focuses exclusively on metals and other "hard minerals."

1. In developing countries the two most popular tax structures are royalties based on sales value and, to a much lesser extent, income taxes. Annual property taxes based on property value or area mined are less important.
2. Very few examples of royalties assessed as a charge per *quantity* mined can be found among developing countries. Several US states assessed taxes based on quantities, but value-based royalties were more typical.
1. Very few examples of the so called Resource Rent Tax<sup>15</sup> were found in 1987. Though, as noted above, this type of tax has the attractive property of not affecting mining investment decisions, most countries apparently find it too difficult to implement because the information requirements are large.

---

<sup>15</sup>

Noted in Appendix III as " Excess Profits Tax."

1.           Developing country royalty rates based on value varied from 2% of sales value on copper in Chile to 9% on Mexican gold.<sup>16</sup> A recent mining code revision in Burkina Faso, for example, calculated royalties based on world (f.o.b.) prices and ranged from 3.0% to 7.0% of those values (Mining Journal, 1993). The Conrad and Hool (1979) survey of value-based royalties assessed in US states revealed a range of .125% on certain minerals in New Mexico to a 10% tax on phosphate production in Florida. Typical rates were in the 2.5% - 5.0% range.

---

<sup>16</sup>

Only simple rates are included in this range. Export taxes in Zaire are omitted as very high, unrepresentative rates.

### ***United States Experience with Mineral Royalties***

In the US, in contrast to countries such as Lithuania, mineral rights may be privately owned. Surprisingly, however, even on land owned by the federal government, no national minerals royalty tax is assessed because of legislation dating to 1872 which aimed to encourage extractions from federal lands. Now that it has been recognized that mining may not be the highest-value use of federal lands, different tax reform packages have been adopted by each of the two houses of the US Congress. Both bills propose increases in royalty payments by mining companies.

The House of Representatives' proposal called for an 8.0% royalty on the gross value of mineral production and the Senate proposed a royalty of 2.0% of net income. These two proposals are very far apart and will be reconciled in meetings between leaders of the two legislative bodies. It is expected that a royalty tax will indeed be enacted, and is expected to be in the range of 2.0 - 5.0% of the gross value of production.

Royalty taxes in the US are assessed by the fifty US states. Some of these royalties are combined with land rent taxes (i.e. property taxes) and/or profit taxes. Rates and rules vary widely and the full list provided by Conrad and Hool, (1979) is presented as Appendix I. To update any of the tax rates denominated in 1978 dollars (rather than as a percentage of extracted value) to 1994 dollars, the value given should be multiplied by 1.788, to account for an average annual economy-wide inflation rate of approximately 3.7% (World Bank, 1994).

It should be noted that not all mineral resources are taxed by the US states, and taxation controversies are not limited to the Federal level. For example, there is a major controversy about taxation of a type of white clay called kaolin in the state of Georgia. This clay is used to make hundreds of products, including paint, rubber, ceramics and toothpaste, and generates over \$800 million in revenues every year. Georgia does not currently tax these resources in any way and there are no set requirements for reclamation of mining lands. There are major environmental and economic questions regarding the equity and efficiency of those decisions (Seabrook, 1993).

## **IV. ISSUES AND RECOMMENDATIONS**

The discussion presented so far has raised a set of issues for the MEP to consider in revising the system of taxation of state-owned natural resources in Lithuania. The main points are summarized below. They are followed by recommendations and by a summary of information needs, assuming that the main features of the current system remain in place.

## Issues to Consider

I. *Is there a clear need for this tax given the existence of three other taxes?*

As discussed above, though the international experience shows that other countries typically use several tax instruments to capture rents, it seems that these taxes more-or-less serve the same purpose. The only differences between the royalty-based natural resource tax and the land rent mining enterprises pay are: a) recipient government agencies differ and b) the rent tax is a more stable source of revenue for the government than a royalty tax.

I. *Should the natural resource tax be based on **gross revenues** or on **quantity extracted** as is currently done?*

As discussed in Section II, most international experience suggests that royalties based on gross revenues are the norm, and that the typical rate is in the 2 - 6% range. Using revenues rather than quantity as a base has the advantage in that it allows the State to share price risk with enterprises. It also makes somewhat less necessary an in-depth investigation of the effects of resource taxes on enterprise profitability. The disadvantages, of course, are that a transparent price must be identified and that the State's tax revenues will be tied to changes in prices.

I. *What are the likely effects on production and foreign exchange earnings of potential tax levels?*

This is a very important point, because it is likely that output reductions will vary depending on how big the change in the tax. For example, while a 10% increase in taxes may cause a 5% decline in output as suggested by Slade (1992), a 100% increase in taxes is likely to result in more than a 50% change in output because of competitiveness effects.

I. *How important is redistribution of resource rents to future generations?*

The main practical implication of this issue is that if explicit redistribution to future generations is desired, then financial mechanisms for *investment* either by the private or public sectors must be designed and put into place.

I. *What is the goal of the tax on water?*

If, as argued by the World Bank, water is plentiful enough that it is not scarce and therefore does not generate rents, there is in fact no value to be redistributed from resource users, such as industrial and energy firms, to the rest of the population. Economic arguments still exist for the tax, however, if the goal is altered to *compensate future generations for increasing scarcity caused by withdrawals of water*, and is combined with a goal to use the water tax as an economic instrument to *encourage conservation*.

## Recommendations to the MEP

A revenue-based royalty within the range typical for other countries is probably the most appropriate form of the natural resource tax. Though a quantity-based tax

may be marginally easier to implement, if the State absorbs some price risk it can, perhaps, reasonably argue for higher average tax collections than if it did not take on that risk.

Sustainable development - in the sense that the wealth of future generations is not reduced by consumption of nonrenewable resources today - requires investment of rents from nonrenewable resources. This means that some savings must occur today. It should be emphasized that preservation of the resource itself is only one form of savings and may not be the most profitable one. It is recommended that explicit judgments be made regarding what portion of rents will be spent today and what part will be invested.<sup>17</sup> Mechanisms must be designed to assure that whatever part is set aside is indeed invested, as was done in Alaska and Alberta where special funds were created. The resources could be targeted for special government investments, or could also be used to create incentives for private sector investment. As was mentioned above, the administrative costs of any such arrangement must be carefully weighed against the expected benefits.

---

<sup>17</sup>

This, of course, might also include the possibility that 100% goes to the current generation.

It seems likely that there is little economic basis for the tax on withdrawals of ground and surface water to support a goal of redistribution of rents. Consideration should be given to revising the goal to encourage conservation and perhaps also to invest for future generations if it seems likely that withdrawals of water today will make future water more expensive. If this condition does not hold, consideration should be given to abolishing the tax on water withdrawals.

### Information Requirements

If the judgment is made to continue to use the royalty tax, but to base it on gross revenues, information requirements are relatively low. Most information would also be required for a proper analysis of a quantity-based royalty. The main requirements are:

Qualitative information on enterprise profitability, including some data on revenues and costs. Qualitative information on the effects of likely price increases on downstream industries in Lithuania.

For major tradable natural resources, information on tax policies in major competitor countries.

Some indication of the likely short and long-run responses of enterprises to increased natural resource taxes. This information may be collected through interviews.

Information on price variability in the recent past to assess the price risk to firms if a quantity-based royalty system is chosen, and to both firms and the State if a revenue-based royalty is chosen. These data are easily available from published sources.

## **REFERENCES**

Conrad, Robert and R. Bryce Hool (1979), *Taxation of Mineral Resources*, Lexington, Massachusetts: Lexington Books.

Gibbons, Diana (1986), *The Economic Value of Water*, Washington D.C., Resources for the Future.

Hartwick, John and Nancy Olewiler (1986), *The Economics of Natural Resource Use*, HarperCollins.

Janukonis, A. (March 1995), Ministry of Environmental Protection, Chief of Mineral Resources Division, Private Communication.

Mining Journal (August 13, 1993), "Country Supplement: Burkina Faso".

Ministry of Environmental Protection of the Republic of Lithuania (1992), "Environmental Protection in the Republic of Lithuania", Information Bulletin No. 1.

Ministry of Environmental Protection and Regional Development, Republic of Latvia (1995), "On the Natural Resources Tax".

Nellor, David (1987), "Sovereignty and Natural Resource Taxation in Developing Countries", *Economic Development and Cultural Change*, **79**.

Nellor, David and Emil Sunley (August, 1994), "Taxation of Natural Resources in Developing Countries", Paper Presented at the 50th Congress of the International Institute of Public Finance, Harvard University.

Pezzy, John (1991), "Sustainable Development Concepts: An Economic Analysis", World Bank Environment Paper Number 2.

Rogers, Peter (November/December 1986), "Water: Not as Cheap as You Think", *Technology Review*.

Seabrook, Charles (May 9, 1993), "White Gold: The Kaolin Story," *The Atlanta Journal and Constitution*.

Slade, Margaret (October, 1992), "Environmental Costs of Natural Resource Commodities: Magnitude and Incidence", World Bank, Background Paper for World Development Report.

Solow, Robert (June 14, 1991), Eighteenth J. Seward Johnson Lecture, Woods Hole Oceanographic Institution, Woods Hole, Massachusetts.



Vincent, Jeffrey (1995), "Natural Resources and Economic Sustainability", Harvard Institute for International Development, Harvard University, Mimeo.

Vincent, Jeffrey, Theodore Panayotou and John Hartwick (September, 1995), "Resource Depletion and Sustainability in Small Open Economies", Environment Discussion Paper No. 8, Harvard Institute for International Development, Harvard University.

World Bank (1994), *World Development Report*.

World Bank (1993), *Lithuania: The Transition to A Market Economy*.